

## **REMARKS**

Applicant thanks for the Examiner's thorough examination of the pending claims and thoughtful comments, and for a subsequent telephonic interview. Applicant will sequentially address the issues raised by the Examiner.

### **I. Office Action (3/23/2007) Summary**

Claims 1-14 were rejected under 35 U.S.C. §101 as allegedly being directed to non-statutory matter. Original Claims 1-14 were rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by a Ph.D dissertation entitled: "Modeling, Analyzing, and Optimization of Cylindrical Stiffened Panels for Reusable Launch Vehicle Structures" written by Venkataraman at University of Florida, 1999 (hereinafter "Venkataraman"). Applicant respectfully traverses the rejections.

### **II. Interview Summary**

The first telephonic interview was conducted between the Examiner, Applicant and the undersigned (representative of the Applicant) on April 20, 2007. The 35 U.S.C. §102 rejections regarding claims 1 and 2 were discussed with respect to cited reference - Venkataraman. The 35 U.S.C. §101 rejections regarding claims 1 and 2 were also discussed. No exhibit was used in the interview. The Examiner suggested adding output to claim 1 to overcome the 101 rejection, and including all of the limitations in the original claim 2 into claim 1. The undersigned respectfully requested that a proposed amended claim 1 to be reviewed by the Examiner.

A second telephonic interview was conducted on April 25, 2007 between the undersigned and the Examiner. The currently amended claim 1 was discussed and the Examiner agreed that the 101 rejection would be overcome with the additional limitation. As to the 102 rejection, there was no definitive agreement, the undersigned and Applicant appreciate the opportunity to understand the interpretation of the Examiner on the claims.

III. Claim Status Summary

In this response, claims 2, 8 and 14 have been canceled. Claims 1, 7 and 13 have been amended to include recited limitations of the original claims 2, 8 and 14, respectively. As a result, claims 1, 3-7 and 9-13 are now pending.

IV. The 35 U.S.C. §101 Rejections

In the current Office Action (OA), the Examiner asserts that “the claims [1-14], as set forth, do not provide the end results of performing these steps to allow ones to access and use it.” The preamble of currently amended claim 1 recites: “A method for distinguishing effects due to bifurcation from effects due to design variable changes used in a finite element analysis (FEA) for designing a structural product by a user of the FEA”, which indicates the results of performing the claimed steps are used by a user or users of the FEA for designing a structural product. In other words, the results are used by a user (i.e., an engineer) to design real world products (e.g., cars, airplanes, etc.).

Furthermore, the last step of claim 1 recites: “examining the finite element analysis responses of maximum and minimum of the set of outliers to determine whether the effects are due to the bifurcation or due to the design variable changes”, which indicates that performing the recited steps in claim 1 results in determination of different structural responses (i.e., FEA results). In other words, a user of the FEA (e.g., an engineer designs and analyzes a car or an airplane) can use the methods of the present invention to make a decision as to whether the results (i.e., effects or responses) obtained from FEA in a set of design experiments are from the bifurcation or from the design variable changes.

V. The 35 U.S.C. § 102(b) Rejections

A. Independent Claim 1

It is axiomatic that the cited reference in a §102 rejection must teach every element of the claim. MPEP 2131. The currently amended claim 1 is reproduced as follows:

1. A method for distinguishing effects due to bifurcation from effects due to design variable changes used in finite element analysis (FEA) for designing a structural product by a user of the FEA, the method comprising:

obtaining in a computing device a plurality of finite element analysis responses for a set of design experiments, wherein each of the set of design experiments has a specific combination of design variables values;

constructing a metamodel from the plurality of finite element analysis responses;

selecting a set of outliers from the set of design experiments whose finite element analysis responses are not predicted by the metamodel;

identifying high likelihood bifurcation region of a FEA model that represents the structural product by plotting an indicating quantity of the finite element analysis responses; and

examining the finite element analysis responses of a couple of the outliers to determine whether the effects are due to the bifurcation or due to the design variable changes, wherein the couple of the outliers is maximum and minimum of the set of outliers.

(emphasis added)

Based on the arguments below, Applicant respectfully submits that the multiple steps recited in Claim 1 are not anticipated by Venkataraman. The amended claim 1 includes additional limitations recited in the original claim 2; therefore no new matters have been added.

a. Overview of Venkataraman

Venkataraman discloses a software program, PANDA2, that facilitates the second objective of the dissertation: “to illustrate the effect of laminate model choice on design optimization. Stiffened composite panels often require a variety of global and local analysis models and approximations. Simplified modeling and approximation

can affect the optimization results if used without proper constraints”. (Page 6 Objectives of the Dissertation, Venkataraman)

1. Venkataraman does NOT disclose the step of “identifying high likelihood bifurcation region of a FEA model that represents the structural product ..”

In page 4 of the previous OA (mailed 4/23/2007), the Examiner asserts that the step “identifying ..” is allegedly anticipated by Venkataraman (pg. 128-130, 170-174).

Applicant respectfully disagrees. “identifying high likelihood bifurcation region of a FEA model..” is not disclosed, taught nor suggested in the pages cited by the Examiners or for that matter anywhere in Venkataraman.

In the present invention, a metamodel is constructed to predict or approximate the structural responses calculated by finite element analyses. A set of outliers is selected from the structural responses predicted or approximated by the metamodel. Then a likely bifurcation region of a finite element analysis model (i.e., portion of the structure may show bifurcation) of each of the outliers is plotted to determine and to identify whether the effects are indeed due to the bifurcation or due to the design variable changes. In the present invention, the bifurcation is unknown before the calculation to the user; therefore, one of the objectives of the present invention is to determine whether a bifurcation has occurred in a structure.

Contrary to the present invention, Venkataraman discloses a typical design optimization for a stiffened panel. In particular, Venkataraman discloses a comparison study of a stiffened

panel using different techniques to calculate buckling load factor, for example, Table 6.8, Figure 6.7, Table 6.9 and Figure 6.8 (pages 169-172 of Venkataraman) show calculated results using PANDA2, Corrected PANDA2, STAGS. Terms such as “local buckling load factor”, “local buckling load”, “local buckling”, and “local buckling estimate” are used in the description thereof. In Venkataraman, the buckling or local buckling is a known state before the calculation as indicated in the first paragraph of page 171: “The PANDA2 local buckling load was corrected using STAGS analyses performed for local buckling of a ring-skin module” (emphasis added). Unlike the present invention, Venkataraman discloses a method that calculates a structure under a local buckling load. In other words, the method disclosed in Venkataraman does not need to identify a bifurcation region at all, because the bifurcation (e.g., local buckling) is a known fact before the calculation.

Therefore, Venkataraman does not disclose, teach nor suggest the step “identifying high likelihood bifurcation region of a FEA model..” in Claim 1.

Based on the above remarks, Applicant believes Claim 1 shall be allowable over the cited references. Reconsideration of Claim 1 is respectfully requested.

B. Independent Claims 7 and 13

Independent Claims 7 and 13 incorporate similar features recited in claim 1 and were rejected for the same or similar reasons as for claim 1. Applicant would like to apply the above remarks for Claim 1 to

support Claims 7 and 13 also. Reconsideration of Claims 7 and 13 is respectfully requested.

C. Dependent Claims

Due to the cancellation of claims 2 and 8, the dependency of claims 6 and 12 has amended to reflect the new dependency.

Dependent claims 3-6 and 9-12 that are dependent upon claims 1 and 7, respectively. The dependent claims contain additional limitations further distinguish them from Venkataraman. Therefore, Claims 3-6 and 9-12 shall be allowable for at least the reasons stated above with regard to independent claims 1 and 7, respectively.

## Summary

In summary, none of the cited references, viewed alone or in combination, have disclosed, taught or suggested the combined features recited in the pending claims. In view of the above remarks, Applicant believes that Claims 1, 3-7, and 9-13 shall be allowable over the cited references. Early and favorable action is being respectfully solicited.

If there are any questions regarding this amendment, the Examiner is respectfully requested to contact the undersigned at (408)255-6853.

The fee associated with filing a RCE under 37 C.F.R. 1.114 has been paid via the Office electronic filing system. No additional fee is believed to be required for this amendment, if it is determined that a fee is due in connection with this paper, the Commissioner is hereby authorized to charge payment of any fees associated with this communication or credit any overpayment, to Deposit Account No. 553308, including any filing fees under 37 CFR § 1.16 for presentation of extra claims and any patent application processing fees under 37 CFR § 1.17.

I hereby certify that this correspondence is being transmitted to the Commissioner for Patents via the Office electronic filing system on the date stated below.

Date: April 25, 2007

Signature: /Roger H. Chu, Reg.# 52745/

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Respectfully submitted;

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